CAM

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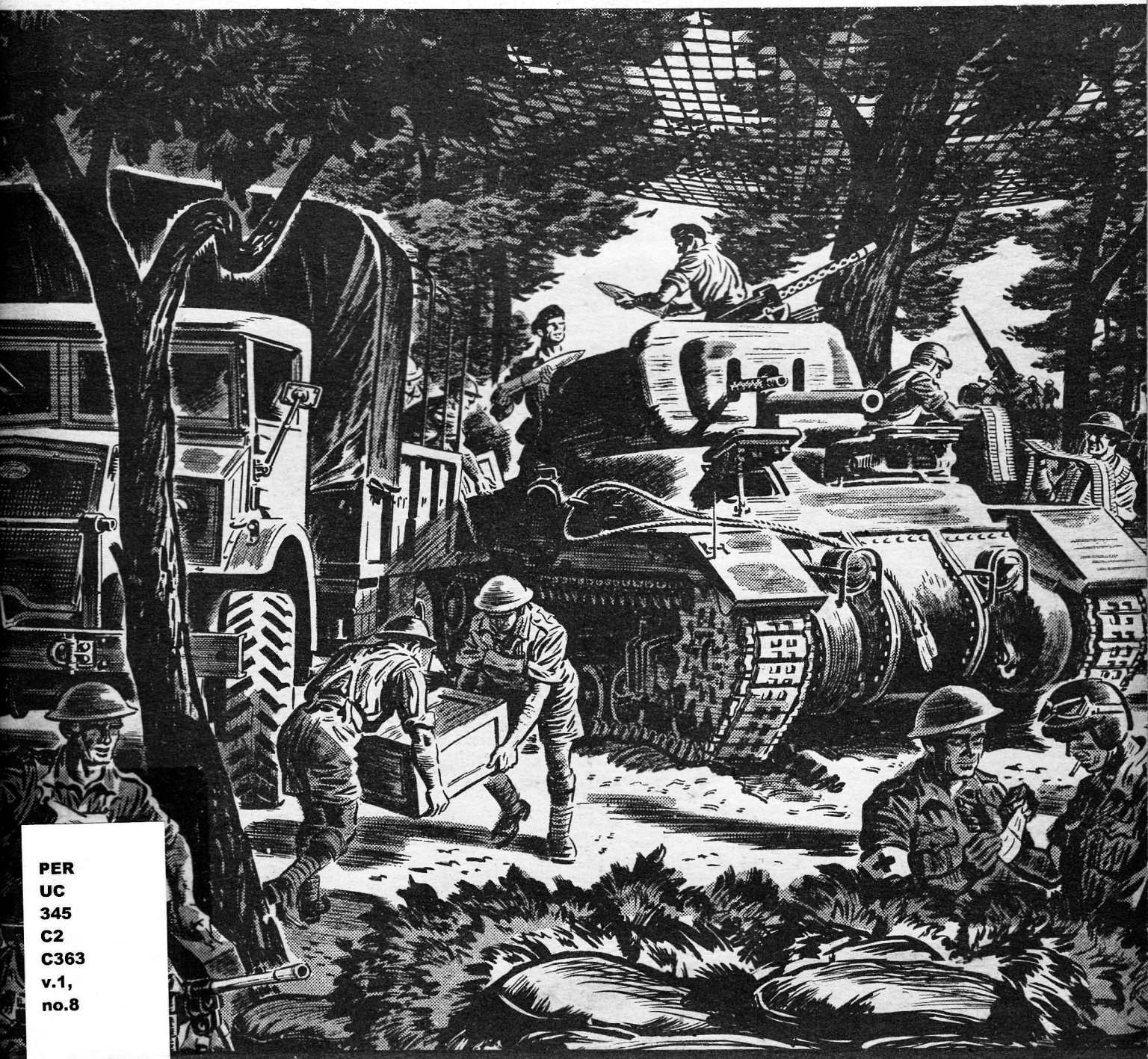

VOLUME 1 NUMBER 8 MAY 1944

EXHAUST

CAM

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VOL. 1 No. 8

WHATEVER YOUR JOB, DO IT WELL

THERE are times when we might wonder if our particular task really has any significance or possesses any importance at all. We are prone to feel this way when progress is slow or when we are discouraged. It is only natural for us to take stock of ourselves and our job, but very often we are shortsighted and fail to see things clearly. In other words, we do not see beyond the end of our noses and may perhaps feel a bit sorry for ourselves and our apparently menial task. But menial or not, the job must be done and someone must do it. It has been said, "In this fight for our very lives, there must of necessity be a man for every job, whether it be commanding an army or washing dishes in a training camp." And, of course, we can't all be commanding officers, we can't all be "the brains of the outfit"; because the Army embraces a host of duties, many of which may not be particularly likeable ones. However, if it happens to be our lot to receive one of these less attractive assignments, if we are ambitious we need not be held down for any length of time. In fact, if we apply ourselves properly and make a success out of whatever we are given to do, such efforts will not be unnoticed. If we are not conscientious and inclined to "let George do it" we have no right to get ahead, and in all probability, will not. If we have a tendency to be slipshod in our work and allow things to go undone, the chances are that we could not be depended upon in the field under combat conditions. We would not only be shirkers, but we would also be helping the enemy. Just remember that the enemy is using all his ingenuity and cunning to neutralize our efforts and to hinder our progress against him. Therefore, if we allow any of our abilities to be wasted unnecessarily or if we do not do our best to get things done, actually the enemy will reap the benefit. No true Canadian wants to aid the enemy!

WE WILL NOT BE BEATEN! Make this your motto when your job gets a bit dull or when your initiative wanes. And bear in mind that there are others depending upon you to do your job, however small it might seem at the time. Everything has a purpose, and every man should have a purpose. We won't all have the opportunity to take the fight to the enemy; some of us will probably never see a German or a Jap. But the fact remains that each one of us is responsible for accomplishing a particular assignment—each one of us may be likened to an individual "task force" with a special mission.

Yes, patience, perseverance and skill, too, are credits to any man's character. Each one of us should bend every effort to make certain that we do our just share in perpetuating the free and democratic life to which we all have been accustomed. We mustn't let down for a moment, for if we do there is an enemy soldier who will make good use of that wasted time. Multiply this, and what do you have? Besides wasted effort and wasted time, other men's lives might be endangered or even lost. Soldier, see your objective clearly and then go ahead and do your job and do it well!

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DRIVING CROSS COUNTRY

SOME day—even after reading this article—you're going to get stuck. If its a crap game we can't do you any good; but if its during a cross country run maybe we can help some to lick that kind of driving.

From long observation we've come to the conclusion that there are three types of potential drivers of motor vehicles.

Number one is ruled (or carried) off quickly. He never gets past the first corner for he's a natural born pedestrian (or chauffeurized millionaire) with no desire or aptitude for the control of anything vehicular.

Number two is the "All or bust" type. This grissle-brain gets through one obstacle only to land up to his neck in the next one.

Thirdly we have Safe Sam—he misses them both—because he knows how to drive. Safe Sam has learned that the fundamental idea behind motor transport is to get there with the vehicle and the cargo **intact.** Failure to do this is failure to complete the mission. Jumping a gully on a motorcycle like in Fig. 1 may show a certain quality of reckless courage and riding ability but from a technical and tactical angle our grissle-bound friend, is absolutely wrong. What's needed more than reckless abandon is the ability to master all obstacles with safety and due care of the equipment. A quick appreciation of the obstacles plus the training and knowledge of how to best tackle them is the stock in trade of the expert driver.

SHIFTING GEARS

The main requisite of the expert is absolute mastery of the gear shift lever. Changes in the terrain and the amount of wheel grip available force the driver to shift constantly—

Fig. 1

and with visibility sometimes limited to short distances—very quickly.

GETTING STUCK

If you get stuck its generally due to

(1) Wheelspin
(2) Stalled engine
(3) Several other reasons which include momentum and flotation. Wheelspin is a dead cert when the driving power of the wheels become greater than their grip on the ground surface. As the motors of most army vehicles are usually of generous proportions, wheelspin is the commonest cause of failure to "make it". Stalled engines are usually the direct result of improper use of the gears.

Besides the pressure of the tires on the ground surface, traction also depends upon the degree of friction (known as the coefficient of friction) between the tires and the ground. This will vary greatly with the kind of tire and the type of surface—and the expert driver is just the fellow who can tell the possibilities of the surface with a quick look.

Giving her the gun in low is therefore more likely to halt you in a slippery spot by increasing the driving power of the wheels over the friction of the tires. So you see power and traction are as closely related as beer and burps.

Remembering this, do everything you can to keep the accelerator steady. Sudden acceleration shoots power in bursts to the wheels, which is just what they're waiting for to start spinning.

If they **do** start spinning, throw out the clutch so that you don't dig the wheels in and have to dig yourself out. Stop the engine and get

out to see how the land lies.—a few quick passes with the shovel may get you rolling again—or the old rocking method may do the trick (Fig. 2.). Back up as far as possible, drive forward immediately, back up again and repeat as often as necessary to give the vehicle enough run to let momentum help you out. Momentum is the thing that will help you lick many a tough spot by saving you from using too low a gear and too much throttle.

CLIMBING HILLS

Hill climbing tricks are the same for all types of trucks—motorcycles need a few different dodges which we'll mention later.

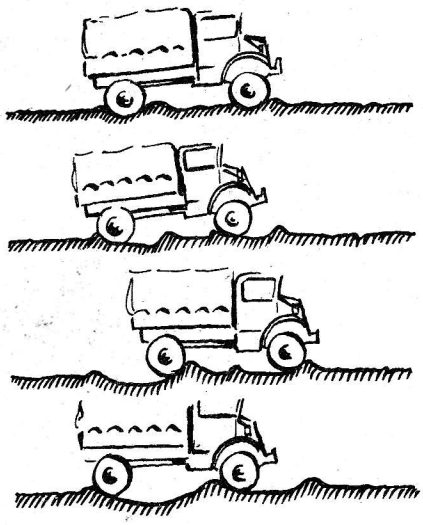


Fig. 2

You can generally name the gear you'll need by looking at the hill—that's fairly easy. The main thing to remember is to get into that gear before you start up the hill. A bad shift on a hill, and they're plenty easy to make, can whip the stuffing out of a transmission quicker'n a wink.

You'll want as much momentum as you can get for the climb so the fastest and straightest practical route is always the best to take (Fig. 3)

If the worst comes to the worst and the vehicle threatens to stall part way up the slope—keep calm, drop into neutral and apply the brakes. Following this, put the vehicle into reverse and back down the hill. To do this simply means taking your feet off the brake and clutch pedals almost simultaneously —the brake just a fraction of a second before the clutch.

Fig. 3

A truck is plenty heavy, so trying to restart on a steep hill can put enough shock load on the clutch and transmission to ruin it.

If the grade is very steep and you figure the vehicle would roll backwards in spite of the brakes, the motor should be switched off. Leave the clutch engaged and you can ease the truck down on the brakes while it is still in forward gear. This won't hurt the motor. **But**—don't try rolling back with the forward gears engaged, the motor running and the clutch out. If that clutch ever engages what will happen to the engine is a sin—to say nothing of what will happen to you when the Sarge finds out. **Every movement of the vehicle should find it in some gear.**

Going down hill is usually considered a cinch for both the driver and the vehicle. However a goodly number of vehicles have suffered untimely ends on the down beat. One goes down hill at the slowest possible speed. One never goes down hill with the gear in neutral, trusting to the brakes—but rather in one gear lower than would be used to climb the hill. There's one other pit fall (perhaps more prevelant on the highway—but it sometimes happens in cross-country driving) and that is letting the engine revs get too high. The "vehicle speed" doesn't have to be very high to cause the "engine speed" to become excessive in the lower gears—and a motor that is forced to rev up over its designed maximum by being 'pushed' down hill will blow up in a fairly short distance—not to mention the dire possibility of the clutch disentigrating and the transmission system generally being reduced to smoking junk. So keep the down hill speed well within the normal road speed for the particular gear you're in by judicious use of the brakes.

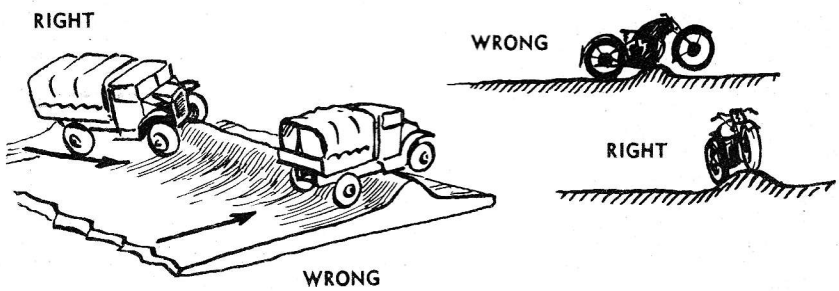


Fig. 4

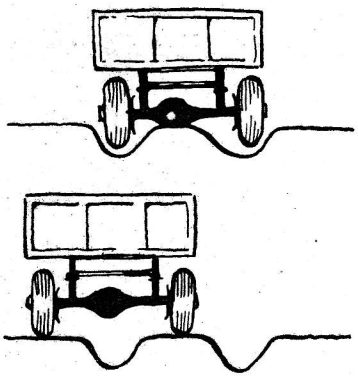


Fig. 5

All the snags of cross country driving do not occur on the hills. Sometimes a small ridge that you could step over can bring a vehicle to a standstill—and to grief. Take the job on the slice of ground in Fig. 4. The angle of approach is what can get you here, for by using the "straight on" approach, the vehicle becomes cradled on the ridge. By coming in at an angle the ridge can be crossed. The big thing to remember here is to take things slowly. By slow and careful driving the temporary distortions to which the truck frame will be subjected to in such cases can be held to a minimum.

Ruts can do the same trick. The smart driver tries to stay out of the deep ones like in Fig. 5. He also knows that a big rock or stump can't get out of the way—but he usually can. If there's no possibility of getting around it, then you have to drive over it with the wheels—but slowly—with the best welfare of the tires in mind. This is always better than a ripped off front axle. (Fig. 6)

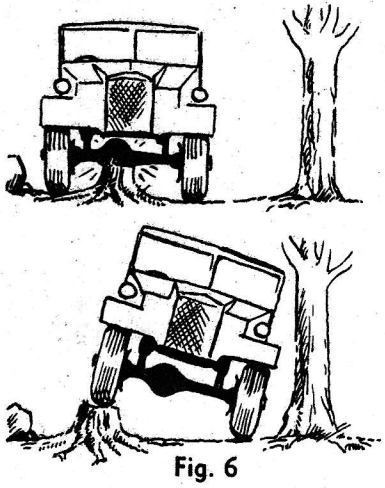


Fig. 6

Like we said earlier, motorcycles require a few extra tricks up your sleeve when you go frolicing on the hills.

The little pictures of Jack and Jill going up the hills accompanying this text will, we fondly hope, show what we mean.

As with trucks, where practical, the straightest line is best—it can be done faster and thus make the fullest use of momentum. Often however, the path is rocky and strewn with pitfalls (as they say at the YWCA). In this case a steady hand on the throttle, and a poised-on-the-auxiliary-foot-rests riding position is the best way to pick your way up.

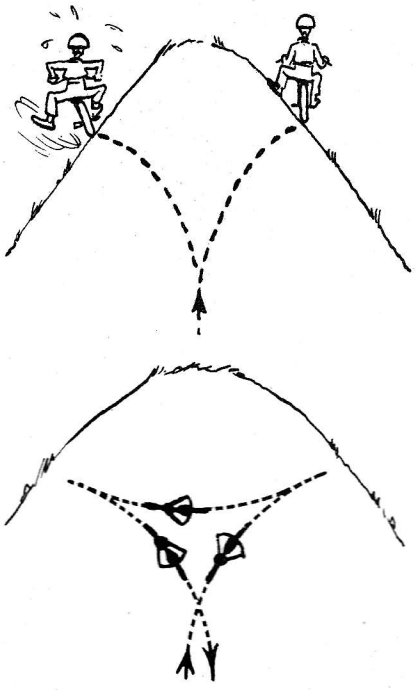


Fig. 7

When for any reason a stop must be made on a slope let Fig. 7 be your guide. Before actually stopping the idea is to turn the front wheel as far as possible to the right—thus placing the machine on a gentler slope and at the same time allowing the rider to keep his right foot on the brake and use his left foot as a prop. If you turn left either the right foot will have to be placed on the ground as a prop, in which case the foot brake can't be used to hold the machine—or the bike will tip sideways down the hill. This is a dangerous way to fall off a m'cycle as it has a habit of following you down the hill—usually managing to catch up and squash the living daylights out of you before you have a chance to get clear.

If for some reason the m'cycle cannot be held on the slope the engine should be stopped and the machine laid on it's side, facing up the slope. Some muscle work applied to the front wheel will get the machine pointed back down the hill. Make sure the machine is still in gear and the clutch engaged and straddle it before you lift it up. Lift —and ride back down as if nothing had happened—switch on, and the impulse of the rear wheel will start the motor for you. (Fig. 8)

This isn't by any means the whole story on the subject but we'll be happy if you just remember the points we've covered and the fact that in cross country driving you can't make a vehicle give more than it's got.

A bad driver always asks too much and comes to grief. A good driver knows what his vehicle can do—and doesn't beat the hell out of it trying the impossible.

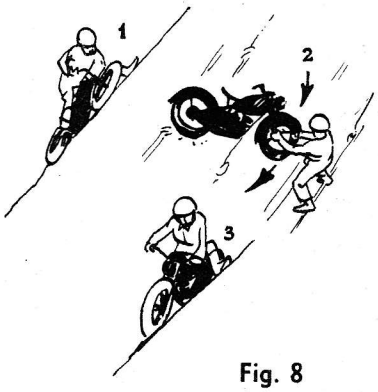
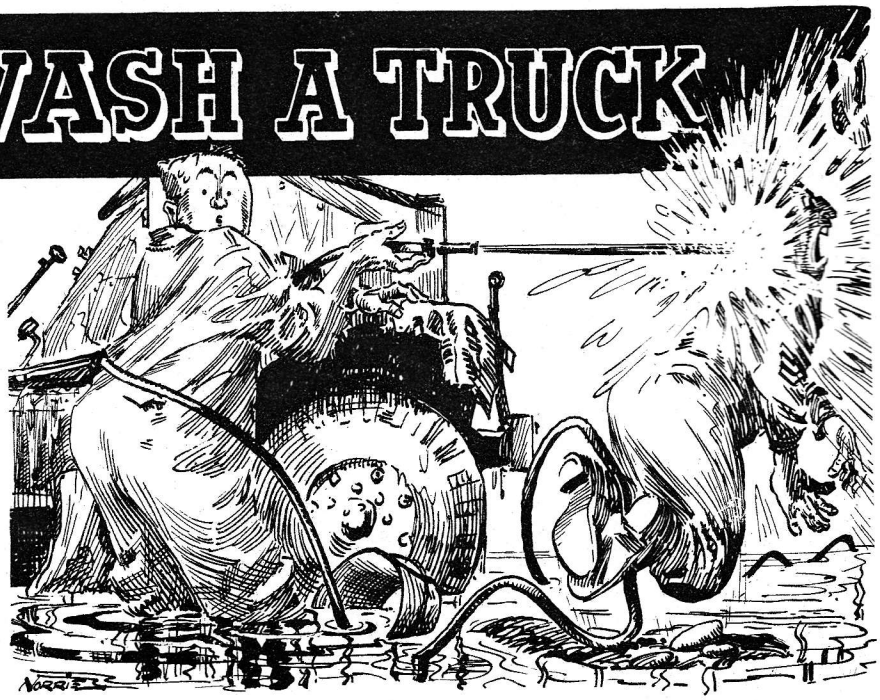


Fig. 8

How To - WASH A TRUCK



..... or "water water everywhere, no wonder the blighter won't go."

DON'T get us wrong. We're just as ready as the next guy (who happens to be a fanatical Inspection Officer) to o-o-h and a-a-h over a spic and span truck. We've always maintained that a reasonable amount of spit and polish is a boon to both vehicle maintenance and driver morale.

But rumour has it that some khakiclads are overdoing the spit. We hate to say it but they're washing trucks too often—or just too damn thoroughly. And those spotless trucks are winding up grounded, thanks to water in the electrical system, water in the gear lube, or water on the knee.

As far as we could find out from our private platoon of undercover agents there is no manual of arms on truck washing—but there does seem to be three popular ways to wash a truck—(1) with a high pressure hose, (2) with higher pressure steam or vapour (3) in babbling brooks. Also uncovered was the fact that there's evidently a right and a wrong way for each way—and both were diligently being followed both hither and yon.

Even the snazzy wool-knit toque we wear at the office can't filter out the blood-curdling cries that come in from the field by phone, mail and pony express.

"Drivers climb up on the bumper, hoist the hood and squirt the hose smack on the engine!"....."that high pressure stream gets into more places than you can count to!"..."The paint job is being beaten to a pulp!"

And adding its quota of rusty starters, generators, distributors and control boxes to the long damp list is the steam cleaner.

You can quote us on the fact that the steam cleaner is a very useful piece of equipment—when properly used. But when we see tarpaulins with all the waterproofing washed out of them—leather seats all curled up—electrical equipment par boiled to a turn—and we know these bahoys have been told in three languages (English, French and profane) and still they raise the hood and let the steam fly—well we begin to feel another attack of the D.T's coming on. The vehicles were clean mind you—not a spot of dust, dirt of oil to be seen—a show room model. But when it comes to putting them to work they're strictly for looking at. As we said before the steam cleaner is a very useful piece of equipment—when properly used—that is when its used for cleaning off assemblies in the work-shop before starting on a job and for cleaning castings, housings etc. Here again, tho', bearings and other polished surfaces take a terrific beating if the steam gets at them and its the smart workshop laddie who knows his steam cleaning—uses it right, in the right places and doesn't run amok and launders everything that comes to hand from the contact breaker points to the O.C's Sunday shirt.

Who does all this truck washing anyhow?

Well it's the Unit's responsibility to see that the driver keeps his truck 'clean' while in operation. A Workshop should see that a truck is clean before re-issue to the using unit—and certainly all assemblies and subassemblies should be thoroughly clean before any work is done on them. C.P.M.S. (Mk I Model) says "Vehicle Clean" at the last of schedule No. 3. C.P.M.S. revised (or Mk II Model) asks in the "after operation" schedule"....is general interior and exterior of Vehicle in good condition and clean?" It's a safe bet that possible future C.P.M.S. and/or tasks systems will all request a "clean condition" as a last parade requirement.

To say however that a driver must

keep his truck clean leaves plenty to the imagination.

How should he clean it? Wash it? Dust it? Sweep it? Use the Hoover? or just blow heartily thru a straw at it?

Well here's a suggested **How**—and we say "suggested" because officially its none of our d—n say-so.

The **daily** job should normally confine itself to cleaning (with a brush or rag) the dirt, trash and gum wrappers from inside the cab and body. Clean off the windshield, windows and rear view mirror. Daily dry rubbing of lustreless paint will create a shine—which will cause reflections—which will in turn cancel out the camouflage properties of the lustreless paint, so forget the family sedan and let the dust on the fenders sit, until wash day. Lastly wipe off the exterior of the engine every day—a little job we maintain that is worth noting in your little black book of notes on "How to Save Toil and Trouble" (along with it you might add a line to remind you when you wipe down gas and oil lines to be "oh so gentle" or the pressure required in trying to polish them will likely loosen or break the joints).

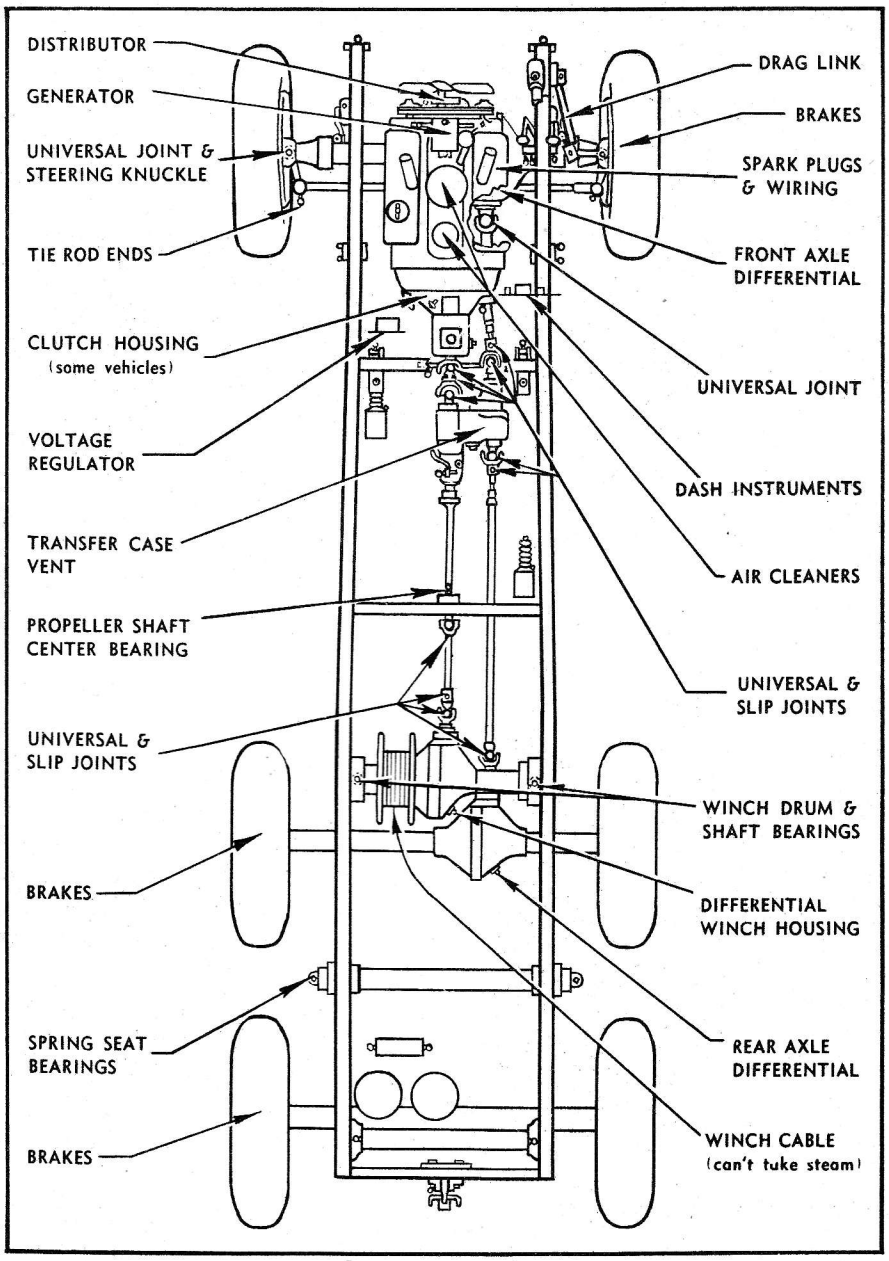
Under the heading **weekly** we'd suggest washing the vehicle when possible—using a hose and a mental picture of our wash chart—instead of the usual vision of the turnip patch back home. That way, you're not likely to play the stream on the engine and into the wheel bearings and brakes.

All of which boiled down into an A/A Shell can be summed up this-a-way.

Dry clean your truck every day after use and in 9 cases out of 9½ it won't need a wet wash more than once a week. Wipe off your engine every day and it may never have to be hit over the head with a hose.

Of course, that's assuming the engine is really clean to begin with. If, by chance, you have to get it that way for a fresh start, scrape off the dirt and oil coating with a flat edged piece of wood! Don't scrape off the paint—just the dirt. Then swab it down with a rag or brush thats been moistened—not soaked-in cleaning solvent (and we **don't** mean gasoline). Then wipe the engine dry. This procedure will remove dandruff, B.O. and 1700 hr shadow. From then on stick to that **daily** wiping with a dry rag—or just oily enough to absorb dust—and you'll be ousting dirt, rust and trouble all at once.

With the high-pressure hose there goes a few nick-nacks worth knowing. It has been said—and we quote leading hose authorities—that just plain water and a pressure hose is the best truck cleaner going-to which we concur. The important thing when you're weilding a hose is how



This gives you a rough idea—if you don't already have one—how many parts of a typical truck can be kayoed by water-on-the-loose. How's your washmanship?

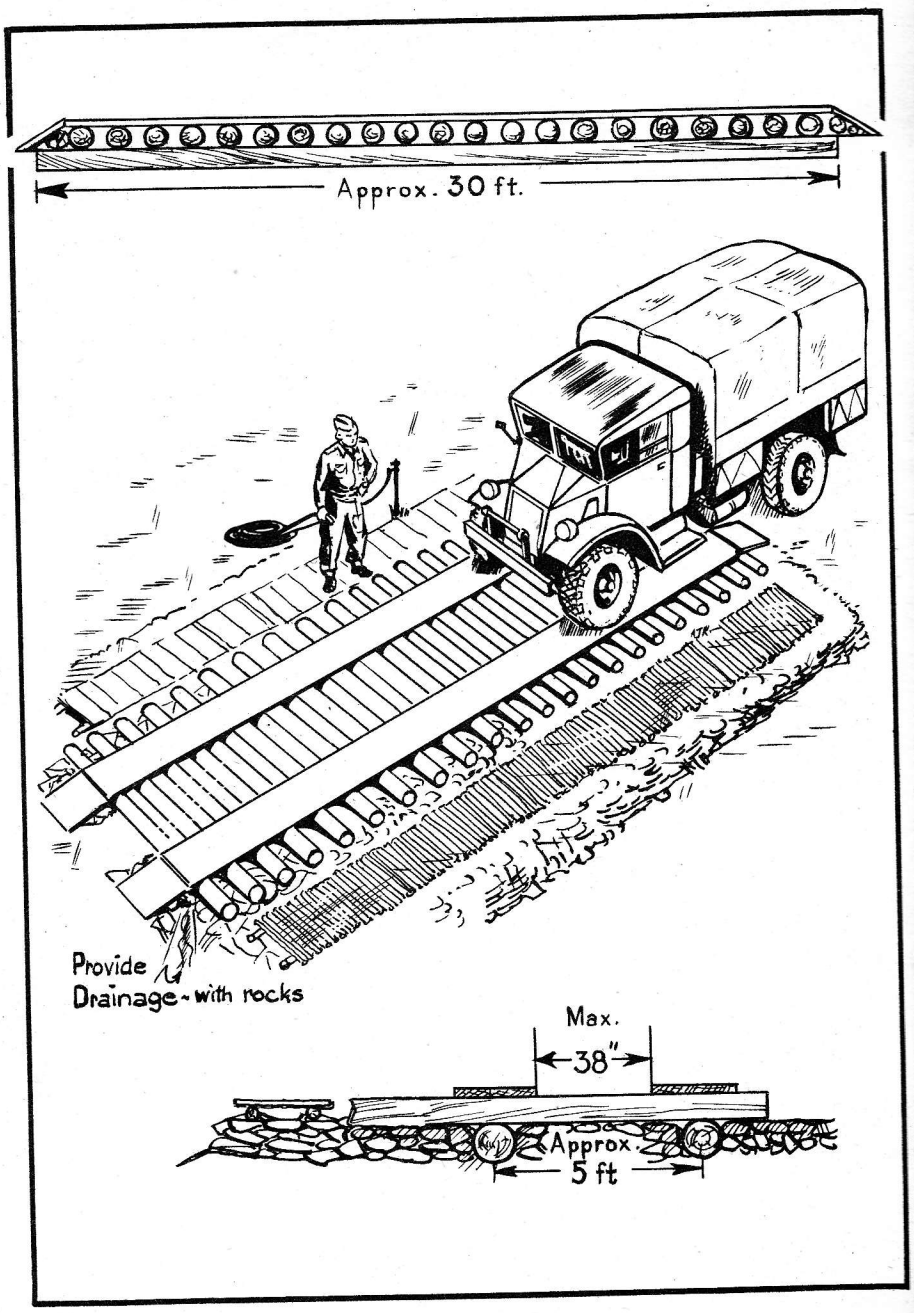
well you aim it. H_2O shouldn't be turned loose under the hood—perish forbid—or inside the Cab, either. It shouldn't be shot point blank at air cleaners or gear case vents or brake drums. If you happened to ask why we'd probably take you on our knee and spell out the facts of Life—all about the birds and the bees, the vulnerability of electrical devices to moisture, the tendency of metals to rust, the effect of water on the effectiveness of grease. The higher the pressure the more sense it makes not to hit your truck where it hurts. If a hose merely drooled on a Vehicle it might never do any harm.

And likewise with steam cleaners—the best rule we know of to observe is **Don't let your truck get filthy enough to need it.** As we've said already steam cleaning has its virtues—but for overall Vehicle cleaning—in unthinking hands they're a hot, damp, ill wind, that blows nobody good.

Earlier we mentioned babbling brooks so we might throw in a couple of words on these poetic aids to truck cleaning. No amount of care is likely to keep a B. brook, river or lake from getting into things—along with generous amounts of mud, sand and shad roe. So when you drive your truck up onto dry ground after its wading party, you'll do well to get a lubrication job—at least on those parts of the chassis that have been submerged. And don't run your truck into too deep water—washing is a driver's job—not a diver's.

All of which might be added up to a not too pretty picture of too-pretty trucks with a maximum of sparkle and a minimum of spunk. How about your vehicle chum—have they got that washed out feeling? Vitamin pills won't help—but maybe there's a couple of thoughts in the foregoing that will—at any rate the worst that can happen to you for trying is dishpan hands.

WASH RACK



WHO says you can't do a good job at washing a truck without a wash rack? You do? And they won't issue you with one from Spare Parts? They won't? Well, wadda-ya-know—guess we've got to start up our engine-uity.

Knowing that there were rafts of ideas around on what a wash rack should look like we choose this raft shown here as "most likely to succeed". Our main reason for doing this being the fact that all you need is a handy grove of trees, an axe and the necessary oral persuasive powers to get your brothers-in-arms to go

chop at the trees with the axe. You, of course, can direct operations according to these plans, get all the credit and become the pride of the regiment.

You'll note we've made our rack about 30 feet long—that will take care of practically any of your M.P. Vehicles. (You can figure a 6 x 6 Workshop lorry for example as being about 21 feet overall) and alternatively allow room for a couple of jeeps at a time. However, you can lengthen or shorten it to suit your requirements. Remembering the jeep —don't let your runway planks get further apart than 38". Here's about what you'll require. Logs, straight, 2 good ones and 30 feet long. About 25—12 foot logs for cross members. Such planks as can be scrounged for use as we show in the drawings (about 130 board feet). A couple of hundred or so 6" or 8" spikes and a handful of 3" nails.

If you've the time, energy, materials and necessity you can perfect this job by the addition of duck boards, handrails and restrooms—Take it away Joe.

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Calcium Chloriditis

Calcium Chloride is about the best encouragement we know of for the rusting and corroding of metal. It just gathers in all the moisture from the surrounding air that it can get its hands on, and sets it to work. Calcium Chloride is used generously on some roads to keep down the dust. From the road it gets onto your vehicle in one easy jump. A coating on spring shackles, brakes and clutch linkage, switches and electric wiring will eat its way into trouble—for you.

A wash job is the only cure for a bad case of calcium chloriditis.

THE CASE OF THE Unhappy Armourer

I'M walking down the main drag of the camp one day awhile back, when my peaceful dreams are shattered by the sudden surge of soul chilling screams that come bursting from a hut on my left. I see that the local inhabitants pay no particular attention to these noises; but I, being a comparative newcomer to the camp, barge right ahead into what on closer inspection proves to be the Armourer's Shop.

Sitting amongst a pile of rifles on the floor, with a bit of what looks like blood stained cloth in his hand, is a chubby Armourer Corporal, wild eyed and frothing at the mouth. I take the bit of cloth out of his hand and find that it is nothing but a piece of rust stained 4 by 2, and attempt to quiet the demented individual. My ministrations are of no avail and inasmuch as he is reaching for a handy bayonet, I beat a hasty retreat and go ask the W.T.O. what gives.

"What lunatic? Oh you mean Mitch" Says the W.T.O. "Well—he comes to this place back last summer and is the happiest wisecrackingest guy you ever tried to borrow ten bucks offa; but lately the condition of the rifle barrels seems to be annoying him slightly and after about every thousandth rusty rifle barrel he has these spells of unhappiness. You see this unit fires many rounds of blank and live ammunition in training and the soldiers, with the exception of occasionally, clean their rifles carefully every time they have been fired; they then forget all about them until next time they have to fire them. Now this business of cleaning the barrel immediately after firing is very very good, especially if boiling water is poured down the barrel and even better if washing soda is added to the water; **but** they always seem to quit there. It's not because they haven't been told, because regularly the Ack I's tell them that for three or four days after firing, the fouling that has driven into the cracks and pores of the steel inside the barrel "sweats" out, absorbs moisture and causes rust, no matter how thoroughly the thing was cleaned in the first place, or how much oil has been splashed in it since, so the only thing to do is clean and keep cleaning.

"When I was with my unit before coming to this training centre" continues the W.T.O., "we sent three Ordnance Armourer blokes to the pecan palace. The drivers carried their weapons with them in their vehicles and because they never fired them figured they didn't need cleaning. In fact they had, I believe, a contest to see who could go longest without touching the Thompson guns and rifles in the vehicles. I'll grant you they had to look after their C.P.M.S. and kept us very happy doing it, but they always seemed to forget that a vehicle isn't going to do you much good if it carries you to the enemy and when you get there all you can do is blow rust at him. Would you like to get in on a little pool we have here on how long it will be before the booby hatch boys come for Mitch"?

I pay my leaf of long green for a ticket on the pool and get a ticket which says it will be a month before they come to measure the Armourer for a strait jacket. I never have any luck.

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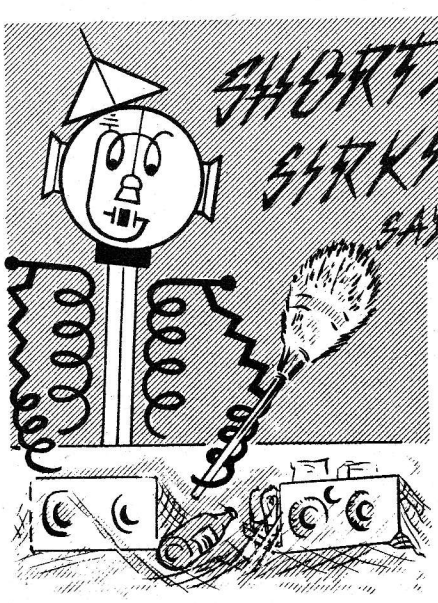

GIVÉM THE BRUSH OFF!

Just like we warned Cousin Zeke when he went to the big city—All is not gold that glitters on the OUTSIDE.

Shorty knows that it's the sparkle on the inside that makes the sparkle on the outside mean something.

WE mean those birds that are nesting up in the equipment on the shelves—Those bees who are using the condensers to store their honey—Those last years flys making themselves at ohm among the terminals and switches.

No doubt the workshop has been cleaned every day (we hope) but how often is the test equipment cleaned? Cleaning the workshop every day has probably stirred up more dust than would fila—ment (large size)—unless you've been extra particular and scattered some damp sawdust around before practicing up on your curling technique. Even then there's plenty that sneaks into the innards of the equipment and settles down to do a job of collecting moisture, causing leakage resistance and generally lowering the efficiency of the unit.

Before you go out and call Joe off his K.P. duties to do the cleaning—this cleaning calls for an expert radio or wireless mechanic. Joe maybe an expert on getting the grit out of spinach (we've yet to meet him, by the way) but his system may not lend itself to electrology.

Proper care and maintenance are obviously necessary if optimum performance and a long and happy life are to be obtained from electrical and mechanical instruments. This is usually followed out on tanks, guns, etc., but we are apt to forget the small items. The accuracy of test equipment is dependent upon the smooth operation of controls free from backlash, clean contacts and exclusion of dust and foreign matter.

Equipment infrequently used may not operate when you next wish to use it. Don't beat your gums in a verbal barrage if this is the case—a cleaning job is the answer.

A solution of half alcohol and half ether, or carbon tetrachloride is recommended (not for you—for the equipment) for switch and relay contacts, contact surfaces of wire-wound controls, slide wires, and mechanical surfaces of various types, such as mouse-trap attenuators, chain drives, gear trains, shafts and bushings. To remove oxidization or corrosion, a fine abrasive such as crocus cloth may be used, but its use is limited to relatively large contact surfaces such as those on various attenuators, relay contacts, rotary switches and push switches.

Proper lubrication is very important in the maintenance of precision instruments. A fine grade of acid-free clock oil is recommended for moving parts such as gear trains, sleeve bearings, vernier drives, condenser bearings, etc. This oiling should be carried out every three or four months, but only a very thin film of oil is necessary.

While you're at the cleaning it is always well to inspect the wiring in an instrument. While every effort is made during manufacture to firmly solder each connection, occasionally one will break loose due to excessive vibration either in transit or in use.

Dials are usually lacquered and do not require much attention. However, the use of an oil polish will improve their appearance. For smooth operation, slow motion drives, either friction—or gear-type, must be cleaned occasionally. A fine brush and a cloth saturated with carbon tetrachloride are satisfactory.

Air condensers require occasional attention and the dirt and lint between the plates can be removed with pipe cleaners. With calibrated condensers, care must be taken not to bend the plates. Foreign matter between terminals on a fixed condenser should be periodically removed. Otherwise, the combination of dirt and moisture will produce a low value of leakage resistance.

An oil polish may be used on wood cabinets, panels and dust covers to improve appearances. The crackle finish can be restored to its original appearance by using an oil polish and carefully wiping afterward.

These are general suggestions—certain of your instruments will require special attention and in such cases specific information will be contained in the instruction book. Go to it chum—and keep it clean.

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For B.F.s

BF AND BI . . . .

" . . . . . he made money out of it . . . . . "

WE remember once seeing a man who could bend iron bars with his teeth and tear telephone directories in half with his bare hands. He made money out of it. There are lots of army drivers with similar accomplishments, however, who only succeed in making trouble.

Ham-handed sums them up. They are the sort of fellows one would like to have around in a spot of bother, but as nurses they are frankly "wet."

Fortunately an Army Vehicle doesn't require much nursing. The engineers who designed it made as many allowances as possible for cave-man handling. But there are some things (besides hiding their light under a bushel) that even engineers can't do.

One of them is to produce a gasket that "gives" and yet doesn't give. The whole purpose of a gasket is to provide a leakproof joint. It has to yield a bit under pressure to do so. It has to be held reasonably tightly in position to form a good seal. But it doesn't have to be crushed. If you over-do the tightening process something is going to give way. Nine times out of ten it is the gasket. Sometimes it is the threads of the bolt or nut that holds it. Whatever it is it does no good to the vehicle.

The moral is "go easy" Coaxing achieves just as much as brute force and adjectival ignorance (B.F. and B.I. in the trade) and it doesn't leave a fraction of the havoc behind it.

Remember that when you check the cylinder head nuts. Remember it when you replace the petrol pump bowl after cleaning the filter. Remember it when you check the connections to the coil and the distributor. And remember it more than ever when you clean the spark plugs.

The "body" of a spark plug, is made of porcelain. If you manhandle it, or if you allow the plug wrench to slip, through not settling it squarely on the hexagon, that porcelain is going to crack. The useful life of the plug is then at an end—although it is more than likely that the sparks will begin to fly somewhere else.

There are plenty of other points on a vehicle where a little bit of care will save a lot of sorrow, but we haven't space to list the lot now. In the main, it's a question of common sense. Use your head. It's one of those things that you can use, you'll find, without wearing it out.

" . . . . . something is going to give way . . . . . "

ARE YOU SYMPATHETIC

"YEH Sarge—what's this tire situation coming to? You tell us we'll get no more new tires except in theatres of operations —We hear stories about synthetic tires being made of part real rubber and part angel cake—that some are 100% synthetic—that they're not worth a tinkers' tink—that they're tops—better than the real thing—what's the lowdown Sarge?"

"O.K. you guys—shoot the questions one at a time. If I know the answers you'll get 'em. There seems to be a lot of misinformation going around on the new tire set up so let's see if we can straighten up some of the story right now."

"Well, Sarge—are tires made of synthetic rubber any good?"

"They sure are. We've used 'em in the Army for months on jeeps, light trucks and station wagons. They even use 'em on airplanes."

"Are they as good as the prewar real rubber tires?"

"Yes and No!"

"Oh, so synthetic rubber isn't really very satisfactory?"

"Hold it! I didn't say that—synthetic rubber is very satisfactory —but no matter how good it is, it isn't natural rubber— and it isn't "natural rubber" made by an artificial method. As a matter of fact it isn't rubber at all, but is an entirely different material. I guess the nearest name for it would be a soft plastic."

"So you'd say synthetic tires **are** O.K.?"

"As O.K. as the best brains in the rubber industry can make them. But what some Joes seem to forget, or don't know, is that while synthetic rubber is the nearest man-made substance to real rubber it still has not been improved to the point where it will take as much punishment as the natural stuff. At least the kind used for tires wont. That's why synthetic tires are not as good as prewar tires."

"Are they ever going to get them as good?"

"There's no doubt about them being as good or mebbe better some day—but it takes time. You can strain out the bad qualities when you make synthetic rubber; build in good ones. That's what a flock of high priced test tube jugglers are busy on right now—but like I said—its going to take time to develop synthetic rubber tires to where they do a job as well as natural rubber under all conditions."

"How long will it take?"

"That's a tough question to answer. It took the industry almost half a century to perfect tires of natural rubber. The emergency of this war has speeded things up on synthetics but you can hardly expect them to pop up with the perfect synthetic tire in one fell swoop."

"What sort of mileage can be got from a synthetic tire?"

"That depends on how well you do your preventive maintenance both on the tire and behind the steering wheel. Matters like speed, air pressure, wheel alignment and brakes have gotta be watched twice as closely. Tires should be rotated regularly. Hitting the ruts like you was piloting a steam roller, driving on car tracks and scuffing curbs doesn't do any good to natural rubber tires—they play merry old hob with synthetics. Jack Rabbit starts and 'on a dime' stops will beat them up fast. **But** driven at regulation speeds **or lower,** the treads will wear as long as those of natural rubber driven at those former hell-bent-for-'lection speeds of not so long ago."

"Then you'd say, Sarge, that the treads are as good as those of natural rubber?"

"I'd say that they'll hold up as well on normal roads. But 'All synthetic' treads chip and cut easier than those of natural rubber when driven over sharp jagged surfaces,—

TO Synthetic?

like gravel, crushed rock, culverts and old castings!"

"Why do they emphasize driving slowly on synthetics?"

"Because high speeds are hard on tires—and harder on synthetic tires."

"But why O Sarjint?"

"Because speed generates heat and heat is the worst enemy of synthetic rubber. Not only is the road punishment higher but the faster you drive the hotter the tires get and you'll literally **burn** them up. Just remember that synthetic tires heat up faster than natural rubber tires."

"Isn't that a pretty big drawback?"

"It doesn't need to be—if you guys drive within the speed laws your tires probably won't get much hotter than those of natural rubber."

"Any other kind of SPECIAL CARE besides driving slowly?"

"Air pressure is mighty important—under inflation of synthetic tires generates heat and as I just told you heat is a particularly bad business for synthetics. That regular check on tire pressure is a MUST for synthetics."

"Will synthetic tires bruise easier that the other?"

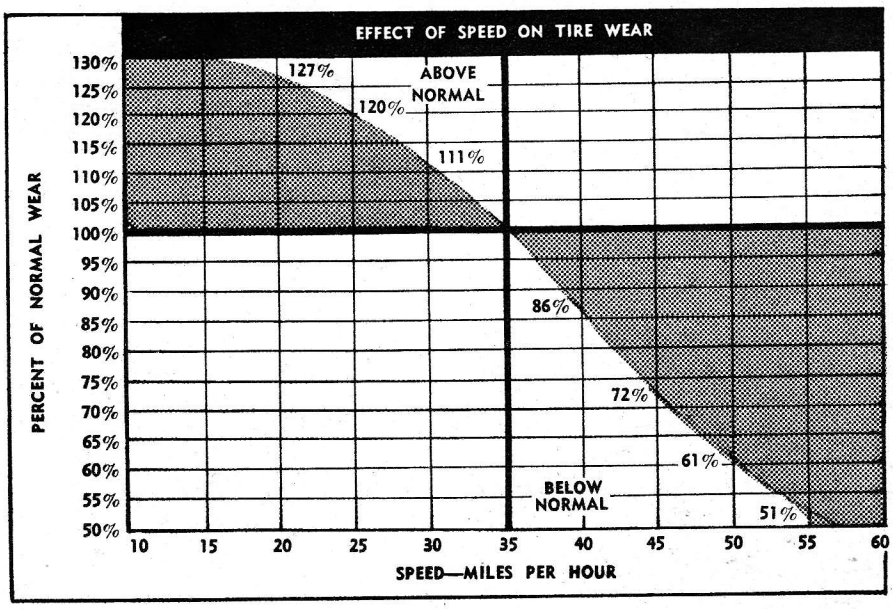
"Frankly old boy—Yes!"

"How about repairing 'em—do you need special equipment?"

"You can repair a synthetic tire just like you do a natural tire, provided you follow the recommendations laid down and don't try any temporary patching jobs—synthetics must be **vulcanized.** This applies to synthetic tubes too—**a cold patch wont hold.**"

"Does what we've been talking about hold good for synthetic rubber tubes too?"

"Its about the same story. With tubes as with tires the tire manufacturer has got the handicap of the synthetic rubber not being elastic as natural rubber—mebbe soon they'll have this problem licked but to date nobody has and its no use to pretend otherwise. In the meantime we've got to get along with the synthetic rubber **as it is.** The funny thing is it doesn't need to be a headache—only if you make it that way. Taking the attitude that synthetics are no good and setting out to prove it by beatin' the livin' whooses out of them wont get you anywhere but into grief. If you're smart, like I think you're smart you'll accept the fact that synthetic tires are not the big bad bogie they're made out to be—when there's a coupon's worth of brains mixed in with their care.



AIR CLEANER SERVICING

IF you didn't put oil in your crankcase you know what would happen.—In no time at all the pistons would be beaten to death and bearing surfaces would be chewing themselves to bits like they were getting ready for a paper chase. Don't put lube in the transmission and you know it won't be long before you have a shovelful of minced metal in there where the gears used to be.

But don't put oil in the oil bath air clean—and nothing happens.

That's what you think!

Have you ever heard of silicosis? No, it's not a mental disease. It's a disease of the lungs caused by the breathing in of silicate, quartz or other abrasive dusts. It's guaranteed to kill—nearly as effectively as lunching on ground glass.

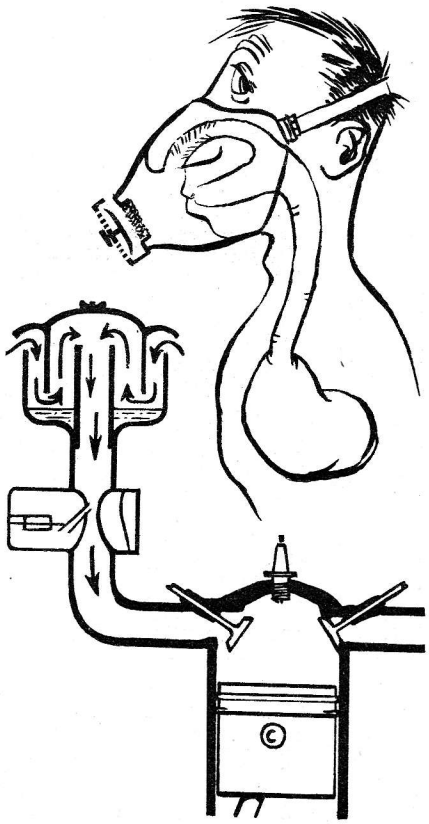
To prevent this dreaded disease—miners, sandblasters and others exposed to these dusts wear respirators —or air cleaners.

Internal combustion engines also breath air—great gobs of it— and they too meet early death by inhaling dirt and grit.

That's why engines have air cleaners (Respirators) and if they aren't working you can mutilate an engine as much as running it without oil in the crankcase—it may take a little longer but the finished job is just as good—or rather, bad.

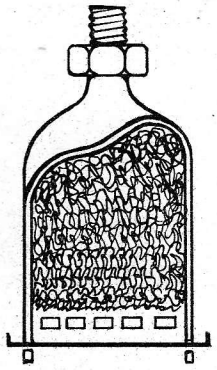
All through a non-functioning air cleaner—yet nothing seems to look wrong when you don't service them—there they sit, when you look under the hood, looking just as peaceful whether you service them or not. Things don't **look** different—but then a saboteur seldom looks like the big bad wolf either. The boys in the workshop could tell you about unserviced air cleaners. They've seen the wear in the inside of those rattling engines that land on their doorsteps before they've even had a chance to collect a good load of carbon.

They could tell you how the grit and dirt drawn into the engine with the air going through the carburetor (A Ram tank engine for instance guzzles 1,500,000 cubic feet of it before its first 100 hr overhaul—enough to last you a couple of years) lacerates the metal surfaces of cylinders—causes the extra clearances because of worn metal—the scores and scratches on bearing surfaces—how they've scraped and dug mud out of crankcases and valve chambers.

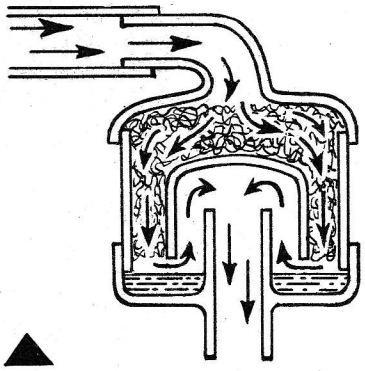


As they explain it, the grit and dust act like a bench grinder on your engine. The rough particles on the surface of the grindstone moving against the work eventually wear the work down. In the engine the rough particles of grit and grime get between cylinder walls and pistons. They chisel and scrape the metal away **better** than a grindstone because the piston's moving about 1000 times **faster!** Bit by bit the cylinders get whittled away 'til they're bigger and bigger and the pistons fit looser and looser. And the same crippling wear is going on in the other moving parts of the engine as well. The grit gets in the oil. You know what the mixture of oil and grit makes—a strong grinding compound. This grinding compound hitches a ride with the oil circulating to every moving part of the engine—the compound gets in between the closest moving surfaces and grates and grinds them away. Then as more and more dirt gets in it mixes with the oil and crankcase condensation to help form sludge—sticky gooey mud that acts like a tourniquet on the oiling system.

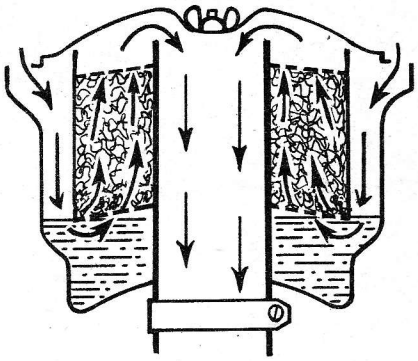
Air cleaners come in all shapes and sizes to meet all sorts of vehicle requirements—Don't let that deter you from getting at their innards—you'll notice they all have the common feature of being easily dissected. All you need in most cases is a thumb and a finger—and the urge to tweek a wing nut.



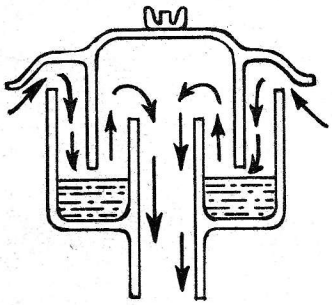
The simplest type of air cleaner is the steel or copper wool held in a clip by a perforated cover and a cotter pin or holding wire. An example of this type can be seen in tank transmissions.



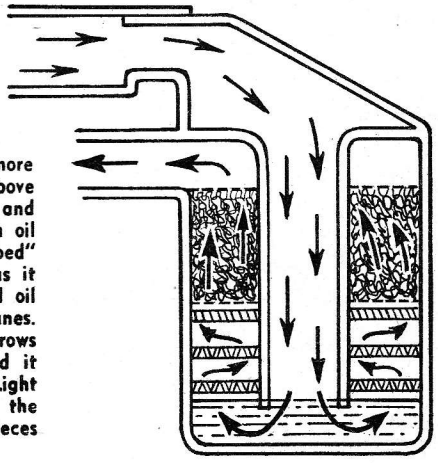
The Ford Motor Company combined the above two types of air cleaner for the air intake on engines as used in the Universal Carrier, air first passing through wool and then over oil.



Another type of cleaner actually passes air through oil. This oil is picked up by the air and carried into steel or copper wool which catches the oil and allows it to drip back into the oil container. The oil that is carried into the wool assists in catching dust and dirt as it twists and turns through the strands. This type is to be found on the 3" Motor Carriage M10.



Another simple type is the passing of air over the surface of oil causing the oil to adhere to and be absorbed by the oil. Usually the air is caused to make a 180° turn just above the oil in order that grit and dirt will be thrown on to the tacky surface. This is the type found in the Ford V-8 crankcase breather system.



The Ram Tank air cleaner is a more complicated type incorporating the above principles but introducing scrubbing and centrifuging. The air passes through oil which it picks up. It is then "scrubbed" by being thrown from side to side as it passes through baffles. The air and oil is then whirled by passing through vanes. This whirling, called centrifuging, throws most of the oil out of the air, and it runs back to the oil container. Light particles of oil are carried up to the wool where it catches very fine pieces of dirt as the air passes through.

It's clear that once dirt and sand from the air get past the air cleaners and into the engine—**you're licked.** All the oil filters and oil pump screens won't take it back.

So the smart thing to do is keep dirt out of the engine in the first place—It's easy to do. Especially since the air cleaners on your vehicle are nearly perfect. They'll snatch up almost every single speck of dirt that passes into them. All they take to stay on the job is a little servicing from you.

The Canadian Army Manual of Maintenance and Lubrication says to check oil level daily and to drain, clean and refill every 100 to 1000 miles depending on operating conditions. On some vehicles the instructions vary as to mileages—but all qualify the mileages given by making them dependent on driving conditions.

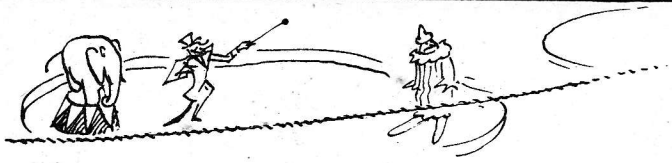
So that makes it up to you to say when the oil bath air cleaner actually needs cleaning and servicing. How're you going to tell? Let's take a typical air cleaner and find out.

LOOK AT THE OIL CUP

Two things about the oil cup: the oil level and the thickness of oil tell you when to service your air cleaners. If the level's **low** just add more oil. If it's **high** its OK if its no more than

(Continued on page 134)

THE DOPE ON --- WIRE ROPE



A Winch or Towing Cable is no Stronger than its Weakest Kink

ON your tank, it's a towing cable. On your truck or halftrack, it's a winch cable. But no matter what you call it—including those unprintable names—it's still wire rope. And, as we pointed out in our article back in October, it still demands a certain amount of respect, or you'll be sorry.

You could probably wrap the Army's wire rope around the world if you went in for that sort of thing. And if the wire rope were all in one piece. But all you're really expected to do is keep your little piece in one piece. How? With preventive maintenance, that's how.

A tank's towing cable is a cinch. Keep it properly hooked up on the hull. Keep a sharp eye out for signs of loosened strands, or weakened end connections (the point of greatest wear is where the cable meets the load). Keep the cable free of rust and corrosion by occasional cleaning and lubrication with engine oil. And that does it. Your winch cable, on a truck or half-track, is a much longer story. It's a much longer cable, to begin with—roughly ten times as long. And its use is at least ten times as complicated. Proper care must be used if you want that cable to pull. Remember—no matter how seldom you use your winch cable, it's got to be right when you need it. And it can't be right if you handle it wrong. Step up for your set of seven basic pointers:

New wire rope should be 'broken in'. A brand-new winch cable should always be limbered up on a few light loads, to help it adjust itself to the kind of work it must do Wire rope will live longer that way—so it's worth the trouble.

AIR CLEANER

(Continued from page 133)

½" above the full mark. If more than ½" above there's a chance of gritty oil being sucked over into the cylinders. So service your complete cleaner. If the oil's **thick,** like molasses, service the cleaner. Thick oil is extra dirty oil. It's too heavy to circulate from the shell to the element, the way oil should. Some of the oily mud sticks up in the element and doesn't drain down to deposit the dirt in the shell. Some of the tarry oil lays still in the bottom of the cup. Not much air cleaning is going on. Briefly then, here's the general symptoms.

Low oil level: add more oil

High level: OK up to ½" above fuel mark over that—service cleaner

Oil like Molasses: Service!

LOOK AT THE ELEMENT

When your air cleaner's freshly serviced the air coming in carries drops of oil from the cup up into the element. The drops collect all the dust and grime they can then drip back down into the cup. That's going on all the time. The element gets a washing all the time. Soon as the oil gets thick with dirt and clings to the bottom of the element (facing the oil) instead of draining down..... right! the cleaner needs servicing. Not much air can fight its way through a layer of gooey muck in the element. Result: rich mixture, engine roll at idling: and a good chance for globs of this oily grinding compound to get sucked into the cylinders.

Now that we've got a fairly good idea of how an air cleaner does its job we should have gathered the know-how on choosing the correct moment to service them. We're not saying you should clean them just because the metal in the element has lost its shine. But don't let silicosis catch up with you either—that would be sili—cosis so easy to do the job right!—right?

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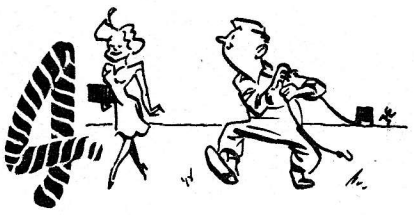
Wire rope needs lubrication. As a protection against rust, corrosion, and excessive wear, a winch cable must be dunked in oil at regular intervals. As you may have heard before, crankcase drainings **can** be used— but our latest word on the subject is that they are not recommended due to the possible acid content and its resultant action on the cable—They're a field expedient based on the realities of supply. Under ideal conditions therefore fresh engine oil (DND 345) is recommended, but ideal conditions are seldom encountered in the field—so we'd say that in an emergency use the crankcase drainings—Lubrication with used oil H.D. is infinitely better than no lube at all. Before lubricating the cable, it's a good idea to clean it with a wire brush, using kerosene (or solvent) to remove accumulated dirt, oil or grease. Dry the cable with absorbent cloth. Then run it slowly through a trough of oil, swabbing off the excess as the cable comes out. (In case you're fresh out of oil troughs, a rag dipped in a bucket of oil and applied tastefully to the cable will do the job almost as well. Wipe off any excess oil.) Keep this in mind, too: If bright spots appear on the cable, it's a sign of faulty lubrication. Make sure it isn't your fault.

Wire rope needs frequent inspection. Be on the watch for splayed strands, broken wires, loose clamps or connections. Look for rust and corrosion, too—though you're not likely to find any if your lubrication is up to par. If the cable looks unhealthy, for any reason—don't use it. Report it.

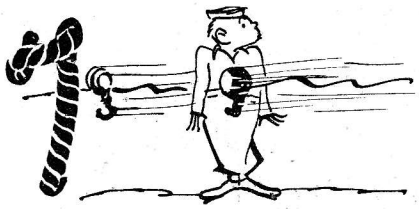


Wire rope must be paid out with care. The usual method is to disengage the sliding-jaw clutch and unreel the winch cable by hand. Use the drag brake to prevent the drum from spinning and the cable from unwinding too fast. Keep the cable taut and straight as it comes off the winch. Kinks are wire rope's worst enemy.

Another thing: Never unwind the cable completely from the drum. That puts a strain on the ferrule and forms a reverse bend in the rope, weakening its point of attachment.

Wire rope needs a clear path for pulling. When there's a load on your cable, make sure it's pulling in the clear—not rubbing against any part of your vehicle, dragging against rocks or through gravel. Chaffing can weaken wire rope in a hurry. So can sudden stresses. If loads are applied to the cable with a quick jerk, the stress may equal many times the actual load being pulled or lifted. Result: Sudden breakage or serious loss of cable strength. Steady pulls are best—and certainly safest.

Wire rope must be skillfully rewound. The way you wind the cable back onto the winch is all-important. Only constant care at this point will keep out kinks and prevent uneven winding—and you've got to do both to keep that rope in trim. Rewind your cable as soon as possible after use. Rewind it under enough tension to insure tight layers on the drum. At least two men should play tug-o'-war with the winch while it's winding. Or the line can be hitched to a tree, the winch pulling the truck along. (with brakes on lightly) as it winds. Where possible guide the layers of cable on the drum most carefully (with a pry bar or the like), so that each row of rope is tight against the next one—all the way across. Use a hammer, on a wood block, to tap each row and layer into place as the winding proceeds. Don't ever let the cable slip down between rows of the layer beneath.



Wire rope can be dangerous. With improper handling or insufficient care, wire rope can become a deadly weapon. If a winch cable snaps under load, all hell breaks loose—and with lightning speed. You won't have time to duck. So keep your distance from a loaded line. Of course, if your cable's condition is what it should be—there's little danger of a break. The shear pin (when fitted) gives way under strains of not more than 10% above the rated capacity of the winch. The tensile strength of a healthy cable is considerably higher. So we might put it this way: Care for your cable —and spare your neck. As a further precaution, wear heavy gloves when handling wire rope. It's full of tiny metal splinters that might mess up your manicure.

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What do you know about WRENCHES?

Says Sarge O'Sweat . . .

"I'M just on my way to keep a date with one", says Pte. Halftrack.

"Come here!"

"Aw Sarge have a heart, I got a date with....."

"Me—and I said wrench—not wench." added the Sarge pulling his trusty black book of notes out of his pocket. "You're willing to spend twice as much time figuring how to get out of learning something that will save you half the time you waste doing the job."

O'Sweat forced the note book between Halftrack's chin and the bench —"Swallow the dope in here on wrenches and that stripe is yours—plus the cash that goes with it. Ain't it worth it?"

"O.K., O.K." sighed Halftrack and opened the note book and started to read aloud.

"Solid non-adjustable wrenches with openings in each end are called open-end wrenches. The size of the openings between the jaws determine the size of the wrench. The smallest wrench in the average set has a 5/16 inch opening in one end and a 3/8 inch opening in the other. Consequently, it would be called a 5/16 by 3/8 open-end wrench. These figures refer to the distance across the flats of the nut or bolt head and not to the bolt diameter. The openings actually measure from five to fifteen thousandths of an inch larger than the nominal sizes marked on the wrenches so that they can easily be slipped onto the nuts or bolt heads."

"The smaller the openings in the wrench, the shorter its over-all length. This proportions the lever advantage of the wrench to the size of the bolt or stud. With a given amount of pull on a wrench, a short one will produce less twisting effort on the nut than a longer one. This helps reduce the possibility of the mechanic applying too great a force at the nut which would either strip the threads or twist the bolt or stud in two. Wrenches with larger openings are made proportionately longer to increase the lever advantage, and they are made heavier to provide the required strength.

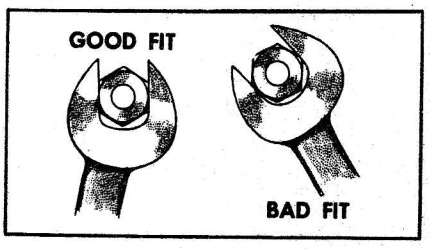
"Talking about strength Sarge....., you know the little blonde chick that the Staff Sergeant was dancing around Saturday night? Well she...."

"Cut it out, cut it out" O'Sweat warned, "get on with the readin!"

"In addition to these standard open-end wrenches there are many special small wrenches for ignition and carburetor work and for machine screw nuts used on electrical equipment. All open-end wrenches have the head and opening at an angle to the body—most of them are 15 degrees—others are 22½ degrees and a few special types are 75 degrees and 90 degrees.

"Which I don't get—Why," pondered Halftrack, "are they made at those particular angles?"

"Unlike you—there is a reason for them being the way they are", said O'Sweat sweetly. "Next time you're working with a wrench in close quarters you can figure it out—If



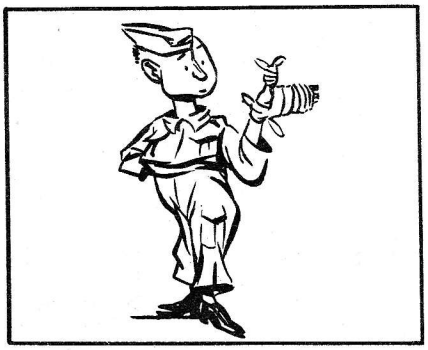
you're loosening a nut and there is very little space in which to swing the wrench you'll find that by flopping the wrench, that is, turning it over so that the other face is down after each stroke—the angle of the head is reversed and will always fit the next two flats on the hexagon nut. The 15 degree angle and the flopping trick will let you turn a hexagon nut continuously when the swing of the wrench is limited to 30 degrees, which is only half the swing which would be required if the wrench opening was straight and not at an angle with the body of the wrench.

"There are a couple of simple matters to remember in correctly using open-end wrenches. Being sure that the wrench fits the nut or bolt head properly is an important one. Nothing ruins wrenches, hexagons and dispositions faster than using a wrench that is too large for the nut—so before you put a hard pull on any wrench make sure the wrench seats snugly and squarely on the sides of the nut. Always **pull** on a wrench—don't push. Pushing on a wrench is dangerous. When you **push** to loosen a tight nut and the nut breaks loose unexpectedly you can count on transplanting the hide from your knuckles onto some handy part of the job. This is not a hard and fast rule—there are exceptions—like when you remove a whole finger by slipping into the fan blade while the motor is running. So if you must push on the wrench—and I'll admit that sometimes this is the only way you can work it—use the base of the palm and hold your hand open. This will save your knuckles (stopping moving fans and the like, will save your fingers.) So there's usually no excuse for mutilating your flippers—except plain carelessness."

"What does it say next Halftrack?"

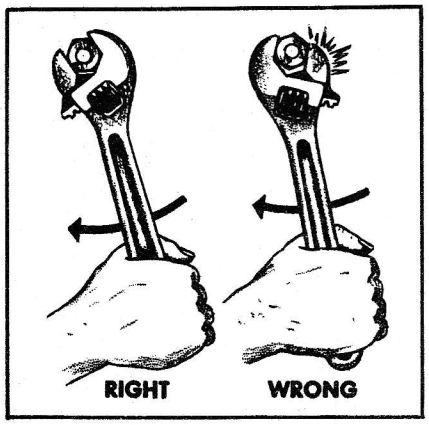
"Adjustable wrenches", reads Halftrack. "These are shaped somewhat similar to open-end wrenches but have one jaw adjustable—How did they get that name—a monkey wrench is adjustable isn't it?"

"The monkey wrench," answered O'Sweat, "got its name from the inventor, Charles Monnkey, but when the term "adjustable wrench" is used it refers only to a wrench which is somewhat like an open-end wrench but has an adjustable jaw. The angle of the opening to the handle on an adjustable wrench is 22½ degrees and they usually come in sizes of 4,6,8,10 and 12 inch but they are also made in a 15 and 18



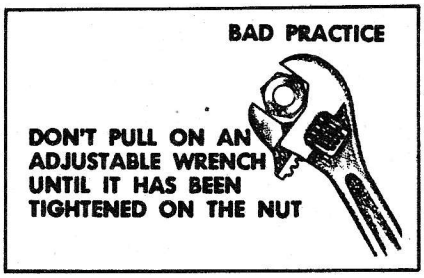
inch size. Some wrench manufacturers make double-end adjustable wrenches too."

"Although adjustable wrenches are very convenient at times they are not meant to take the place of standard open-end wrenches, box wrenches or socket wrenches. Smaller adjustable wrenches are principally used when you find an odd size nut or bolt that one of your "fixed" wrenches doesn't fit. Adjustables are also handy to have in a portable kit such as is carried on a vehicle. They cut down the number of open-end wrenches that have to be carried."



"Good idea," murmured Halftrack dreaming of his date.

"Adjustable wrenches aren't intended for hard service—treat them gently. Whenever you have to exert any amount of force on an adjustable wrench to "break loose" a tight nut or "snug down" a nut which is being tightened—there are two important points to remember. First, always place the wrench on the nut so that the pulling force is applied to the stationary jaw side of the handle. Adjustable wrenches can withstand the greatest force when used in this manner. Second, after placing the wrench on the nut, tighten the adjusting knurl so that the wrench fits snugly. If these two precautions are not taken the life



of the wrench will be short—like yours Halftrack if you don't wake up!"

Halftrack opened one eye to signify he was awake and O'Sweat went on—"Adjustable wrenches, like all tools, should be kept clean. Give them an occasional bath in a cleaning solvent and apply a little oil to the knurl and the sides of the adjustable jaw where it slides in the body. Inspect them for cracked knurls or jaws which may result in failures."

"Anything more you want to know about wrenches, Halftrack?"

"Yeh—what was that phone number again—oh—er—wrenches?—Oh, not a thing Sarge—I always did say there's nothing like a good pipe wrench for fixing the distributor—hey! Don't throw that Sarge—you might hurt someone!

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Handling BALL BEARINGS

How to tell a good one from a bad one.

How to keep from making good ones bad ones.

WHAT'S the first thing you do when a transmission or transfer case starts jumping out of gear? If a differential gets noisy? If a generator stops charging? Don't tell us—let's ask Elmer, the man who handles the defect reports in Vehicles Group, of D. of M.M.

"Sure, I'll tell you," fulminates Elmer, "the sons of guns pull out all the ball bearings and send them to me as defective."

Of course he didn't mean you—he meant a couple of other yahoos—but he sure had a stack of bearings to back up his story—some good bearings, some bad, but mostly good. It was the stack of good ones that had him close to a hemorrhage.

"I don't want to butt into the mechanic's business," said Elmer, 'but there must be some other way of fixing trucks besides taking out all the ball bearings."

Purely and simply, the trouble is that a mechanic, after sweating all day over a messy job, doesn't relish the idea of having all his work go for naught because of a measly little bearing. He's got the job all torn down, he makes the fix and then when he goes to put things back together again, he stares the old bearing in the face and wonders if it's good. He can't tell for sure at a casual glance so he figures why risk the job. "Sure, why should I?" He throws the bearing on the defective pile and installs a new one.

This little method, though it eases the troubled mind of the mechanic, is just another bag under Elmer's eyes—you can't blame him for complaining that it's an obscenity shame to replace a bearing just because it happens to be in a unit that needed service for some reason other than bearing trouble.

What it all boils down to is this: The mechanic must know his bearings. He's got to know how to tell a good one from a bad one, and the kind of care it takes to get the most out of them. Bearings are critical material.

Unfortunately—and strangely enough—the most natural thing a man will do in handling a bearing is usually wrong. How many times have you seen a mechanic pull a bearing out of a job and start spinning it with his hand—or maybe with the air gun? Like a kid with a top.

Then he feels of it, pronounces it 'rough', and chucks it on the discard pile. After spinning it like that it probably is ready for the discard pile.

Well, that's one way of checking it—but the bearing in question never got the benefit of the doubt. Who knows? Maybe a couple of pieces of dirt or cuttings fell into the bearing while the job was under way. In that case, the 'roughness' was probably nothing more or less than a hunk of trash imbedded in the race. Wash the bearing in clean solvent before removing it from the shaft or even turning it—and imbedded dirt is removed from the picture—the bearing gets a square deal.

Blowing a bearing with an air hose is all right, BUT—and this is important—**don't allow it to spin.** We know the impulse is hard to resist. As we say, give a man a bearing and a hundred pounds of air pressure and you got the same juicy set-up as a kid, a bean-shooter, and a nearby bald-head.

There's no better way of scratching and scoring the balls and race than by spinning. Scratched and scored bearings are dead bearings.

When you've cleaned your bearings, give them a squirt of engine oil before turning them in your hand to check for roughness. Lubrication, you know.

Dirt in a bearing is poison. Don't jerk out a shaft with bearings on it and toss it on a dirty bench or floor, intending to 'clean them later.' Or after cleaning—don't lay bearings aside unprotected, feeling that just because they were clean once they'll stay clean.

Having nothing better at hand, wrap bearings—on shafts or unattached—in clean newspaper until you're ready for them.

If the cleaning operation itself is not thorough, an innocent bearing may get a one-way ticket to the junk heap. We mean that particles

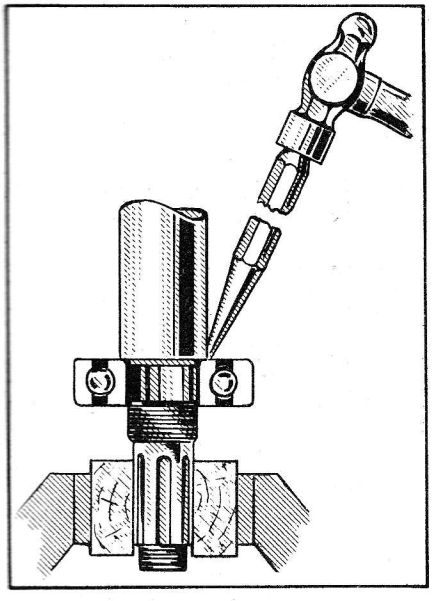
of hard grease sometimes cannot be removed from the interior of bearings by ordinary means. You hang the bearings on a wire and slosh them around in the solvent and the hardened grease won't budge.

In this case, heat some D.N.D. 345 engine oil to about 170 degrees, and soak the bearing in it—this'll usually do the job.

Sometimes sludge deposits stick tight to both balls and races—making the bearing feel rough. Tough deposits like these may require the use of carbon tetrachloride. But, have a caution—when carbon tet or any other highly volatile fluid is used for cleaning, the surface of the bearing is left entirely denuded of oil—the slightest moisture—from your fingers or from the air—will quickly rust them. Lubricate bearings after such cleaning.

So much depends on 'feel' when judging bearings that some mechanics squirm in making a judgment. But a little study and reasoning makes every man his own expert.

A bearing-feeler, 1st class, knows that abrasives can become trapped in the retainer, and gradually wear down the diameter of the balls by lapping action. The same abrasives get in the raceways and alter their size. This makes for a lot of end-play, and general looseness.



When pressing a bearing off a shafe apply the force to the seated ring.

If all bearing looseness was due to wear, you'd be safe in throwing away all loose bearings—assured that they were no good.

But all loose bearings are not necessarily worn bearings — some bearings are manufactured loose. Single-row bearings, for instance, are made for a heavy press fit on a shaft and they're built loose to take care of the natural expansion that takes place when they're mounted.

To check whether looseness is intentional or is simply due to wear and abrasive action, look at the color: The balls and race of a bearing loose due to wear, are dull gray; a normal bearing is bright and mirrorlike.

In checking a loose-built bearing, examine for brightness as above—and in addition check for roughness this way: Press the inner and outer races towards each other to make sure you're getting contact at the point of pressure, then roll it around gently and 'feel' for roughness.

Side-play is not permissable in a double-row bearing. Remember this while checking a double-row bearing for roughness. Roll the rings around in your hand or on the shaft. If you feel roughness, the bearing is shot; if you feel side-play, it's likewise no good. Replace the bearing.

Bearings probably get most abuse during removal and replacement on a shaft or in a housing, or through carelessness in examining the surfaces of their seat. Never allow the pressure from the arbor press, or the blows of a hammer on a soft, steel drift to be applied to the bearing ring which is not seated. **Always apply force to the ring that's seated!** If a bearing is tightly seated in a housing, the outer ring should receive the pressure. Otherwise the force is transmitted through the balls, and they will be damaged.

When a bearing is to be installed on a revolving shaft, a tight or press fit is absolutely necessary to keep the shaft from spinning in the bearing ring. Slippage will result in scuffing and abrading of both the shaft and ring—don't depend on a clamp nut to hold a loosely-fitted race.

Terminal Termites

"Once upon a time there were three Bears....."

That's one fairy tale—there's also another one.....

"Once upon a time it was recommended that grease be put on battery terminals."

We're not saying they don't make good stories—SO LONG AS YOU DON'T BELIEVE THEM.

Now that you're old enough to be in the army we're safe in tipping you off that this "Three Bears" story was just a gag—likewise the greasing battery terminals tale.

Don't use GREASE — DO USE VASELINE or MINERAL JELLY (DND 665)

Knowing you'd want to know "why"—we asked a friend of ours who is a distant relative of a chemical engineer. We quote: "Generally speaking there are two types of grease; soap base grease and neutral or non-soap base grease. Some soap base greases dissolve in water—so you can reflect on what this would do to the terminals. When the electrolyte (about 36% acid) reached the grease it would dissolve in it and be held in close contact with the terminal—the better to do its dirty work".

"What about non soap-base grease?" we wanted to know.

"Can you tell the difference between the two types?" asks our friend.

Not wishing to appear too ignorant we promised to use only vaseline or mineral jelly from now on.

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A too-tight fit may cause the ring to crack. If you've got any doubt at all about the fit, measure it and be sure. A loose bearing isn't a gamble—it's sure trouble.

Finally, if after all is said and done, you find the race loose on the shaft or in the housing—replace the shaft or housing. Don't try any tricks—like shimming or trying to hold the bearing with a clamp nut. Replace the shaft or the housing.

If you don't get anything else out of this article there's one thought we'd like you to take away with you: Use clean hands, clean tools and clean lubricant in handling bearings—they're precision parts manufactured to the closeness of a bug's eyelash—you can't play rough with them.

And remember, when installing bearings, start them squarely on their seat, don't use a chisel or a hard, steel drift on the inner race—or a hammer on the outer race.

Like any mechanical part, a bearing will wear out, will suffer from fatigue. But with reasonable care, with protection from acid and moisture and given the proper lubrication, it'll live a long life and a happy one.

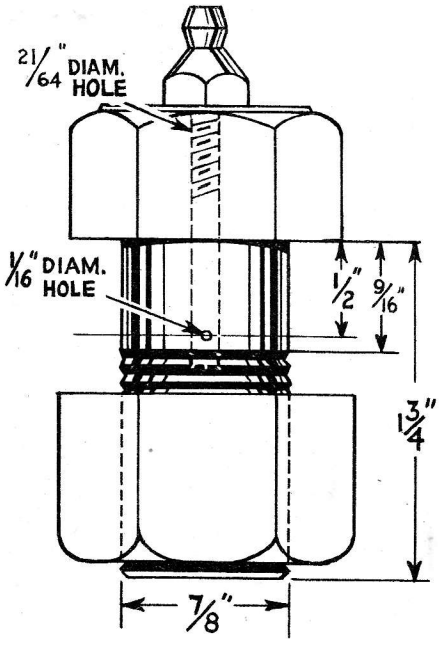
And because you're a mechanic and reap the rewards of a job well done—so will you.

PIVOT PIN BEARING

These oft' neglected sealed type bearings get a new lease on life with this greasing tool which does a 100% job according to the workshop lads at C.M.D. London—who made it up.

The job is simple.....

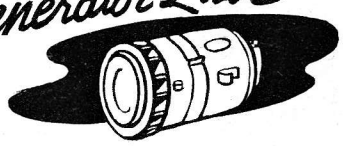
All you need to start with is a 7/8" bolt 1 3/4" long, a nut to fit and a grease fitting. The thread on the bolt must extend within 9/16" of the head. Drill a 21/64" hole to extend down through the centre of the bolt for 1 1/2" and tap to take the grease fitting. Now drill a 1/16" hole through the side of the bolt, 1/2" below the bolt head, to meet



the hole in the centre—this provides a passage for the grease to be forced into the bearing. The life size sketch shows the idea and dimensions.

Using the tool is as simple as making it. Just install it in the bearing with the grease fitting on the same side as the brass retainer ring on the bearing. Be sure to do this or the grease outlet on the tool won't line up with the opening in the bearing. Install the nut by hand and apply the grease gun, forcing out all the old lubricant and filling with new grease.

Generator Lube



There's been some changes made:

Probably as long as you can remember, the generator's been one of those items you could never guess about when lubricating a truck. On some jobs it needed lubrication.....on some it didn't.

From now on, generators on vehicles being manufactured WILL REQUIRE LUBRICATION. So when it comes to generators you'd better not take the word of your Lube Guide or vehicle Manual. When they're revised they'll show the change. Depend on these publications to tell you **everything else** on lubrication, but not about the latest generators. Better depend on your eyesight. If you see oil cups sticking up there, begging for maintenance, give them 3 or 4 drops of engine oil every 1000 miles.

Don't let this give you the idea somebody's trying to make work for you. You've got plenty now and the high-ups holding the reins know it. The real blame belongs to the bearing shortage. The two big bearing manufacturers are all out of the size ball bearings needed in truck generators. The shortage has forced them to take out the sealed bearing that did'nt need your lubrication and put in a plain bushing.

So the bearing shortage hits you with an extra lubrication point—so far. And all the more reason for taking care of the bearings you've got—by giving them the right lubricant, in the right amount, at the right time. That will keep the shortage from spreading and turning around to cause you more work.

Meantime, when lubricating vehicles from now on, remember you've got the generator on your hands. Look at it both ends. If you find oil cups you know what to do.

CANADIAN-BRITISH & U.S. LUBE EQUIVALENTS

	CANADIAN DND SPECIFICATION NUMBER	EQUIVALENT BRITISH GRADE	U.S. PRODUCT SYMBOL	U.S. SPECIFICATION	STANDARD PRODUCT	CONTAINER MARKINGS		
								
ENGINE OILS	DND-345	10 HD	OE-10	USA 2-104 B	Oil, Engine SAE 10	Yellow	Yellow	Container Marked with DND Number
	DND-365	30 HD	OE-30	USA 2-104 B	Oil, Engine SAE 30	Gray	Gray	
	DND-395	50 HD	OE-50	USA 2-104 B	Oil, Engine SAE 50	Maroon	Maroon	
GEAR OILS	DND-360 A B or C	Hypoid 80	GO-80	USA 2-105 or FED. VV-L-761	Lubricant, Gear, Universal SAE 80	Light Blue	Light Blue	Container Marked with DND Number
	DND-390 A B or C	Hypoid 90	GO-90	USA 2-105 or FED. VV-L-761	Lubricant, Gear, Universal, SAE 90	White	White	
	(NONE)	C-600	C-600	(NONE)	Oil, Gear, Compounded	(NONE)	Blue	(NONE)
GREASES	DND-670	Grease No. 0	CG-0	USA 2-106 (Amendment 2)	Grease, Gen. Purpose No. 0	Containers Marked with Product Symbol	Containers Marked with Grade Symbol	Containers Marked with DND Number
	DND-671	Grease No. 1	CG-1	USA 2-107 (Amendment 2)	Grease, Gen. Purpose No. 1			
	DND-672	Grease No. 2	WB-2	USA 2-108 (Amendment 2)	Grease, Gen. Purpose No. 2			
	DND-673	Grease No. 3	WB-3	USA 2-110 (Amendment 4)	Grease, Wheel Bearing, H.D.			
	DND-604	Grease No. 4	WP	USA 2-109 (Amendment 2)	Grease, Water Pump			

What most Canadians know about British and U.S. Lubes could be put in a grease fitting. Which isn't anybody's fault because up to now the information hasn't been correlated and circulated. And it's only just recently that more or less general agreement has been reached on basic lube standards.

The lube types and grades listed here are those most commonly used by the three armies. All meet substantially uniform specifications and approval tests—the idea being, of course, to permit interchangeability of petroleum supplies and to minimize the number of different oils and greases required in a theatre of operations.

This doesn't mean you can throw a quart of "Gilhooley's 30" from the corner service station in with your DND 365—it won't have the detergent additives and won't take kindly to the army lube already in there. It does mean that if you are in need of lube somewhere within hailing distance of the Yanks or the Tommies their OE-30 or 30HD will take to your DND 365 like a DUKW to water because they're now heavy duty—full of additives and readily digestible in all our engines.

Canada's New Corps!

BRITAIN'S Royal Electrical and Mechanical Engineers, born of the exigencies of this war two years ago, took over the inspection, maintenance and repair of army electrical and mechanical equipment in all theatres of operations.

Ever since then, Canada has watched Britain's rooky "REME" develop into a skilled, useful and specialized member of the forces, and is now ready to join hands with the parent British Organization.

The Corps of Royal Canadian Electrical and Mechanical Engineers has been formed as a part of the Canadian Army.

What's this going to mean to Private Smith—Armourer Sergeant Jones—Trooper Murphy—and all the rest of your sidekicks?

Well you may be wearing the new R.C.E.M.E. badge and flashes if you're a tradesman in certain groups—maybe you'll only meet these lads of R.C.E.M.E. in the Workshops and the L.A.Ds.

But the change is more than skin deep.

The creation of a separate corps who's sole responsibility is maintenance means closer and more specialized attention.

This concentration of effort will simplify the direction and control of maintenance and repair—especially in the field of action, and by the same token will help to standardize and maintain the high level of efficiency necessary for waging effective mechanized warfare.

R.C.E.M.E. does not relieve the unit one iota from its *preventive maintenance* responsibilities—but R.C.E.M.E. will stand behind those P.M. efforts with improved, more efficient and stronger technical resources and help.

Without a doubt R.C.E.M.E. will have its teething troubles. They will be minor. We've learned a lot from our parent Corps overseas and the skill and knowledge of the craftsmen who will form this Corps has been assured by careful selection and long training.

An improved organization of that skill can only add fuel to the fire that cooks the axis goose.

R.C.E.M.E. is out to do a bigger and better job—and it's a job we're all interested in seeing finished.

ROYAL CANADIAN ELECTRICAL and MECHANICAL ENGINEERS